Plant Physiol. (1983) 72, ix–xi
0032-0889/83/73/ix/03/$00.50/0

Author Index

A

Acaster, Michael A., 139
Acevedo, Edmundo, 775
Ahrens, William H., 925
Albersheim, Peter, 557, 864
Alberte, Randall S., 409, 625
Allen, Robert D., 746
Alscher-Herman, Ruth, 573
Amundson, Robert G., 573
Andersen, William R., 76
Anderson, Louise E., 573
Andrews, Chris J., 303, 535
Andrews, Jaen, 735
Armstrong, William, 280
Asker, Hassan, 134
Aspart, Lorette, 115
Atkins, Craig A., 308, 1029
Avissar, Yael J., 200
Avron, Mordhay, 593
Azcón-Bieto, Joaquin, 598

B

Badilla, Ignacio, 775
Bajaj, K. L., 891
Ball, Erika, 7
Bandurski, Robert S., 526
Barber, James, 225, 1119
Barthe, Philippe, 1005
Bassham, James A., 420
Batchelor, Susan M., 219
Bates, George W., 1110
Becker, Wayne M., 402
Bedmar, Eulogio J., 1011
Beevers, Harry, 434
Belkin, Shimshon, 825
Belknap, William R., 1130
Ben-Amotz, Ami, 593
Benedict, Chauncey R., 37, 897
Ben-Hayyim, Gozal, 685
Bennett, Alan B., 781, 837
Berkowitz, Gerald A., 1100, 1123
Bewley, J. Derek, 376
Bhatia, Satish K., 746
Bickett, D. Mark, 339
Black, Jr., Clanton C., 455
Black, M. Kay, 1021
Bond, Heather M., 345
Bonish, P. M., 1001
Boss, Wendy F., 1016
Botton, Bernard, 398
Bowles, Dianna J., 345
Boydston, Rick, 151
Boyer, Charles D., 813
Boyer, Nicole, 522
Bradford, Kent J., 245, 251
Brandt, Peter, 616
Bressan, Ray A., 645
Briggs, Winslow R., 706
Bright, Simon W. J., 821
Briskin, Donald P., 1133
Broué, Paul, 1114
Browne, Christopher L., 1040
Bryan, Barbara A., 256
Buchanan, Bob B., 259, 870, 877
Buhl, Michelle Badzinski, 664
Bulard, Camille, 1005

C

Cantliffe, Daniel J., 146
Carpita, Nicholas C., 515
Casal, Jorge Jose, 900
Cassar, Rachel A., 219
Chapman, David J., 225
Chappell, Joseph, 434
Chartier, Yvette, 26
Chen, Changguo, 481, 488, 1123
Chen, Nancy Jung, 382
Chen, Sheng-Shu, 455
Chen, Tony Hwei-Hwang, 122
Christensen, Tove M. I. E., 156
Christian, James K., 713
Cleland, Robert E., 326, 332
Cohen, Jerry D., 691
Cohen, Peter B., 754
Conder, Michael J., 547
Copeland, Les, 659
Cornwell, Karen L., 420
Cosgrove, Daniel J., 326, 332
Cousson, Alain, 33
Cram, John, 204
Crookes, Philip R., 1088

D

Daie, Jaleh, 1, 430
Daniel, R. M., 1001
Darvill, Alan G., 864
Data, Emma S., 186
Datta, Ketaki, 394
Davies, David D., 134
Davis, Lawrence C., 1051
Day, David A., 598
De-Felice, John, 225
Delseny, Michel, 115
de Luca, Vincenzo, 891
Deregibus, Victor Alejandro, 900
Desbiez, Marie-Odile, 522
Dixon, Michael A., 1094
Donker-Koopman, Wilma E., 287
Doss, Robert P., 713
Douce, Roland, 802
Dowgert, Michael F., 978
Dry, Ian B., 291
Duke, Stanley, H., 919
Dumas, Theodore, 855
Dumortier, Françoise M., 915
Dunbar, John, 725
Dwelle, R. B., 172

E

Eastwell, Kenneth C., 50
Edie, Scott A., 156, 1011
Edwards, Gerald E., 728
Eichholtz, David A., 750
Ellenson, James L., 90
Elliott, Daphne C., 215, 219
Eskew, David L., 262
Evans, John R., 297
Everson, Garth, 455

F

Falkowski, Paul G., 829
Fang, Sheng C., 1040
Farquhar, Graham D., 245
Feldman, Lewis J., 833
Felker, Frederick C., 679
Fincher, Geoffrey B., 754
Fisher, Mary B., 813
Flores, Hector E., 915
Focht, Dennis D., 971
Fondy, Bernadette R., 964
Fox, Theodore C., 964
Franceschi, Vincent R., 362, 586
Fry, Stephen C., 864
Furbank, R. T., 321

G

Gadal, Pierre, 22
Galston, Arthur W., 915
Gao, Ji-Yin, 303
Gaspar, Thomas, 522
Gaynor, John J., 80, 1110
Gee, Sherry L., 420
Geiger, Donald R., 964
Gerbaud, A., 321
Gerhardt, Richard, 1139
Gianfagna, Thomas, 86
Giaquinta, Robert T., 362, 586
Gibbs, Martin, 481, 488, 1100, 1123
Gifford, David J., 376
Got, Alain, 115
Greppin, Hubert, 1136
Greve, L. Carl, 668
Grierson, Donald, 1088
Griffiths, W. Trevor, 229
Grimes, Howard D., 1016
Grivet, Cyril, 906
Grodzinski, Bernard, 604
Gundersen, Robert E., 903
Gusta, Lawrence V., 105, 122

H

Hadwiger, Lee A., 553
Hall, David I., 654
Hall, Nigel P., 945
Handa, Avtar K., 645
Handa, Sangita, 645
Handley, Levis W., 498
Harding, Roy W., 996
Harel, Eitan, 1056, 1062
Harper, James E., 503, 510
Harrison, Mark, 1075
Harvey, Tamara M., 919
Hase, T., 391
Hasegawa, Koji, 391
Hasegawa, Paul M., 645
Heinz, Ernst, 273
Heldt, Hans W., 767, 1139
Hellergren, John, 992
Herrmann, Klaus M., 750
Hetherington, Suzan E., 1043
Hill, Robert D., 809
Hirel, Bertrand, 22
Hodges, Michael, 1119
Hofinger, Michel, 522
Holloway, Peter J., 795
Hondred, David, 402
Horn, Michael E., 426
Huber, Steven C., 474

Hurley, P. J., 172
Hutcheson, Steven W., 870, 877

I

Ibrahim, Ragai K., 891
Iglesias, Ana, 564, 570
Ireland, Robert J., 1127
Ishii, Shigetaka, 641
Iwatsuki, Norio, 186

J

Jaffe, Mordecai J., 177
Jäger, Hans-Jürgen, 590
Jendrisak, Jerry, 1068
Jensen, Thomas E., 583
Jochimsen, Bjarne U., 56
Johnson, Carl Hirschie, 129
Jonsson, Lisbeth M. V., 287
Journet, Etienne-Pascal, 802
Joy, Kenneth W., 1127

K

Kakefuda, Genichi, 919
Kaplan, Aaron, 886
Kay, Steve A., 229
Keegstra, Kenneth, 735
Keithly, J. H., 897
Kelly, Barbara M., 351, 356
Kende, Hans, 139, 441, 447
Kennedy, Robert A., 44, 787
Kerres, Rudolph, 590
Keys, Alfred J., 945
Khouri, Henry, 891
Kimura, Yosh, 713
Klein, Uwe, 481, 488
Kleinhofs, Andris, 949
Kochba, Joshua, 685
Koeppe, David E., 151
Kohl, Daniel H., 256
Kojima, Mineo, 186
Kolacz, Kathryn, 166
Koreeda, M., 391
Krampitz, Lester O., 1084
Kueh, Joseph S. H., 821
Kuo, Tsung-Min, 949
Kursar, Thomas A., 409
Kürzel, Birgit, 1139

L

Labavitch, John M., 668
La Favre, Jeffrey S., 971
Lambers, Hans, 598
Larkins, Brian A., 151
LaRue, Thomas A., 695, 701
Laties, George G., 953, 959
Lawyer, Arthur L., 420
Lee, Tsung T., 855
Leopold, A. Carl, 190
Letham, David S., 858
Lieberman, Steven J., 583
Lin, Willy, 362
Livingston, Robert S., 530
Lord, J. Michael, 547
Lurquin, Paul F., 386
Lusk, William J., 86
Luthe, Dawn Sywassink, 578
Lynch, Daniel V., 903

M

MacGregor, Alexander W., 809
Maclean, Donald J., 795
Macnicol, Peter K., 492
Madhavan, S., 897
Mandoli, Dina F., 706
Mann, A. Fred, 22
Marcus, Abraham, 394
Marinos, Nicos G., 219
Marme, Dieter, 1136
Marsh, Loren, 394
Martin, Bjorn, 925
Martin, Francis, 398
Maxwell, Carl A., 469
McClendon, John H., 674
McFeeters, Roger F., 498
McKersie, Bryan D., 620, 911
McMillen, G. Gilbert, 674
McNally, Sheila F., 22
Meller, Erna, 1056
Melles, Sahle, 996
Métraux, Jean-Pierre, 441
Meudt, Werner J., 691
Meyer, Yves, 26
Michel, Burlyn E., 60, 66
Mishkind, Michael L., 847
Mocquot, Bernard, 115
Mogi, Yoko, 641
Momonoki, Yoshie S., 526
Montano, Jorge, 909
Msatef, Yamina, 398
Mulligan, R. Michael, 415

N

Ne'eman, Emma, 1056, 1062
Nelson, Curtis J., 16
Nelson, Oliver E., 679
Nelson, Richard S., 503, 510
Neumann, Peter M., 182
Neyra, Carlos A., 71
Nielsen, N. C., 1114
Niki, Teruo, 105
Nobel, Park S., 775
Noodén, Larry D., 182
Nordin, Philip, 1051
Novacky, Anton, 7

O

Oaks, Ann, 949
O'Hara, G. W., 1001
Oliver, David J., 194
O'Neill, Sharman D., 837, 931, 938
Ormrod, Douglas P., 96
Ort, Donald R., 925
Outlaw, Jr., William H., 60

P

Padan, Etana, 825
Pahlich, Edwin, 590
Paietta, John, 764
Palni, Lok Man S., 858
Pate, John S., 308
Patterson, Thomas G., 695, 701
Paull, Robert E., 382
Pavek, J. J., 172
Paxton, Jack D., 151
Penel, Claude, 1136
Perkins, Karen K., 1016
Peterson, David M., 679
Peterson, Jay B., 695
Pharr, David M., 498
Phillips, Donald A., 156, 1011
Pihakaski, Seppo J., 535
Platt-Aloia, Kathryn A., 481
Ploeger, Bernard J., 964
Polacco, Joseph C., 262
Pomeroy, M. Keith, 303, 535
Poole, Ronald J., 1133
Porter, Michael A., 604
Pradet, Alain, 115, 1035
Prange, Robert K., 96

Q

Quail, Peter H., 264

R

Raba, Richard M., 90
Rainbird, Ross M., 268, 308
Randall, Douglas D., 16
Rao, I. Madhusudana, 573
Raps, Shirley, 829
Raskin, Ilya, 447
Rayder, Lisa, 606, 611
Rayle, David L., 99
Raymond, Philippe, 1035
Reibach, Paul H., 634, 897
Reid, James B., 759
Reinero, Antonio, 256
Reinhold, Leonora, 886
Ridley, Stuart M., 461
Rinehart, Claire A., 76
Robitaille, Henry A., 750
Rognes, Sven E., 821
Roskoski, Joann P., 909
Rossi, Hernan A., 578
Roughan, P. Grattan, 273
Rufty, Jr., Thomas W., 474
Rumpho, Mary E., 44, 787
Ryan, Sarah A., 503, 510

S

Sadler, Nancy L., 362
Saftner, Robert A., 1
Saglio, Pierre H., 1035
Sakai, Akira, 105
Sanchez, Rodolfo A., 900
Sargent, Malcolm L., 764
Sarojini, G., 194
Satler, Sergio O., 540
Satter, Ruth L., 564, 570
Schaer, John A., 706
Schefczik, Kurt, 368
Scheffer, Robert P., 530
Schibeci, Angelo, 754
Schiebe, Michael, 368
Schmidt, Gregory W., 847
Schmitt, Mark R., 728
Schram, André W., 287
Schulze, Aga, 526
Schumacher, Thomas E., 212
Scott, Kenneth J., 795
Selph, Nicola, 1075
Senaratna, Tissa, 620, 911
Sharkey, Thomas D., 245
Shearer, Georgia, 256
Sheehy, Raymond E., 306
Shekhawat, Narpat S., 915, 1110
Shelp, Barry J., 1029
Sherrard, Joseph H., 426
Siedow, James N., 339
Siegel, Albert, 166
Siegelman, Harold W., 829
Silverthorne, Jane, 717
Simonis, Wilhelm, 368
Skeeters, Jerri L., 256
Skuzeski, Jim, 1068
Sloger, Charles, 741
Smillie, Robert M., 1043
Smith, Ivan K., 654
Smucker, Alvin J. M., 212
Somers, David A., 949
Spanswick, Roger M., 781, 837
Stade, Susan, 469

Staswick, Paul E., 1114
Steele, K. W., 1001
Stelzig, David A., 746
Stewart, Cecil R., 664
Stewart, George R., 22
Steponkus, Peter L., 978
Stiekema, Willem J., 717
Still, Cecil C., 80
Stipanovic, R. V., 897
Stitt, Mark, 767, 1139
Stoller, Edward W., 925
Stosic, Vladimir, 1136
Streeter, John G., 634
Stumpf, Paul K., 50
Summons, Roger E., 858

T

Tanner, Gregory J., 659
Taylor, Jr., George E., 237
Telewski, Frank W., 177
Tezuka, Takafumi, 959
Thimann, Kenneth V., 540
Thompson, Jr., Guy A., 903
Thorne, John H., 268
Timpo, Emelia E., 71
Ting, Irwin P., 606, 611
Tingey, David T., 237
Tingey, Scott V., 76
Titus, David E., 402
Tobin, Elaine M., 717
Tolbert, N. Edward, 415, 1075
Tucker, Anthony T., 182
Turner, John F., 659
Tyler, Nancy J., 122
Tyree, Melvin T., 1094

U

Uemura, Matsuo, 105
Uitslager, Piet, 287
Ullrich-Eberius, Cornelia I., 7
Uritani, Ikuzo, 186

V

Valdovinos, Jack G., 583
Van, Kiem Tran Thanh, 33
van Berkum, Peter, 741
Vance, Carroll P., 469
VanderZee, Delma, 787
van Kessel, Christopher, 909
Vertucci, Christina, 190
Vierling, Elizabeth, 625
Vierstra, Richard D., 264
Villegas, Cynthia Dolores V., 186
Volokita, Micha, 886
von Kessell, Barbara, 616

W

Wagoner, Wendy, 553
Wakefield, Andrew H., 177
Walburg, Gregory, 161
Wallner, Stephen J., 817
Warner, Robert L., 949
Watkins, James T., 146
Webb, Trevor, 280
Wedding, R. T., 1021
Weeden, Norman F., 259
Weinstein, Lawrence I., 557
Welch, Ross M., 262
Weselake, Randall J., 809
Widholm, Jack M., 426
Wiggins, Olson K., 60
Williams, William E., 906
Wilson, A. T., 725
Wilson, Barbara, 415
Wimpee, Charles F., 717
Winkler, Rodney G., 262
Wirtz, Wolfgang, 767
Wiskich, Joseph T., 291
Wittenbach, V. A., 586
Wong, Joshua H. H., 16, 37
Woo, K. C., 313, 321
Wood, Timothy, 909
Woolley, Joseph T., 989
Wright, Luann Z., 99
Wu, Min-Tze, 817
Wyman, Kevin, 829
Wyse, Roger E., 1, 430

Y

Yamazaki, Noboru, 864
Yarris, C. E., 1084
Yokoyama, Henry, 897
Yoshida, Shizuo, 105

Z

Zeevaart, Jan A. D., 86
Zeiger, Eduardo, 906

Plant Physiol. (1983) 72, xii–xviii
0032-0889/83/72/xii/07/$00.50/0

Subject Index

A

Abscisic acid
  aerobic and anaerobic leaching, apple embryo, 1005
  and decanoic acid, Dutch iris, 713
  functional influence, *flacca* tomato mutant, 245, 251
  uptake, source-sink tissue, soybean, 430
Abscission, ethylene effects, tobacco pedicel, 583
Acacia pennatula, $^{15}N_2$ fixation and H_2 evolution, 909
Acer pseudoplatanus L. (see Sycamore)
Acer saccharinum (*see* Silver maple)
Acer saccharum (*see* Sugar maple)
Acetylene reduction, host effects on *Rhizobium* nitrogenase, 156
Acidification (*see also* pH)
  respiratory-dependent, oat protoplast, 356
Acidity, diurnal, and water relations, *Opuntia*, 775
acyl-CoA synthetase location, chloroplast envelope membrane, pea, 735
acyl-CoA thioesterase location, chloroplast envelope membrane, pea, 735
Adenylate nucleotide, regulation of acetyl-CoA carboxylase, 50
Adzuki bean, CO_2 fixation, root nodule, 469
Aeration, deep water rice, 447
Air maintenance, intercellular spaces, maize and potato, 989
Albizia lebbeck, $^{15}N_2$ fixation and H_2 evolution, 909
Alfalfa, CO_2 fixation, root nodule, 469
Amaranth, lipid metabolism, chloroplast, 273
Amaranthus cruentus, protoplast fusion by electric fields, 1110
Amaranthus hybridus, triazine-resistant, photosynthesis, 925
Amaranthus lividus L. (*see* Amaranth)
Amaranthus tricolor
  calmodulin inhibitors and cytokinin action, 215
  effect of calmodulin-binding drugs on response to plant hormones, 219
American plum, photosynthesis and leaf density thickness, 674
Amino acid
  developmental changes, pea cotyledon, 492
  uptake
    barley mutants, 821
    soybean embryo, 781
1-Aminocyclopropane-1-carboxylate synthase regulation, tomato, 139
5-Aminolevulinate synthesis, *Anabaena*, 200
5-Aminolevulinic acid, synthesis routes, maize leaf, 1056, 1062
Aminooxyacetate, stimulation of glycolate formation and excretion, *Chlamydomonas*, 1075
α-Amylase inhibitor, barley, 809
Anabaena variabilis, 5-aminolevulinate synthesis, 200
Anaerobiosis
  and dormancy release, apple embryo, 1005
  barnyard grass seed, 44, 787
Ananas comosus L. (*see* Pineapple)
Anoxia, and RNA synthesis, rice embryo, 115
Anthocyanin methyltransferase, subcellular localization, *Petunia* flower, 287
Apple
  anaerobiosis and dormancy release, embryo, 1005
  protein changes during seed stratification, 750
Arabinogalactan-protein biosynthesis, ryegrass endosperm, 754
Arachidonic acid-stressed tissue, inhibition of phytoalexin synthesis, potato, 746
Aryl acylamidase activity, rice leaf, 80
Asparagine metabolism, localization, pea leaf, 1127
Asparagus sprengeri regel, inorganic carbon supply for photosynthesis, mesophyll, 886
Aspartyl phosphate, plasma membrane ATPase, red beet, 1133
Assimilate
  transfer and compartmentation, soybean leaf, 586
  transport, shrunken endosperm mutant, barley, 679
ATP, green tissue level, effect of cyanide, 7
ATPase, aspartyl phosphate, red beet plasma membrane, 1133
Auxin
  and H^+ excretion, sunflower shoot gravitropism, 99
  effect of calmodulin-binding drugs on response, *Amaranthus*, 219
  effect on water transport and growth, pea internode, 332
Avena sativa L. (*see* Oat)

B

Barley
  α-amylase inhibitor, 809
  electron transport limits, chloroplast, 795
  lysine uptake mutants, 821
  mercury vapor uptake, 1040
  NaCl effect on proline synthesis, leaf, 664
  nitrate reductase regulation, 949
  P_{700} Chl *a*-protein, 625
  ribulose-1,5-bisphosphate carboxylase variability, 76
  shrunken endosperm mutant, 679
Barnyard grass, anaerobiosis, seed, 44, 787
Bean
  brassinosteroid response, 691
  CO_2 fixation, root nodule, 469
  gas exchange and phytoluminography, leaf, 90
  nitrogen assimilation, 71
Beta vulgaris cicla (*see* Swiss chard)
Beta vulgaris L. (*see* Red beet; Sugar beet)
Birdsfoot trefoil, CO_2 fixation, root nodule, 469
Brassica oleracea (*see* Cabbage)
Brassinosteroid response, bean, 691
Bryonia dioica, thigmomorphogenesis, ethylene, and lithium, 522
Butyl gallate binding, mung bean mitochondria, 339

C

Ca^{2+} transport, and calmodulin, spinach leaf, 1136
Cabbage, cystine lyase, 654
Cajanus cajan (*see* Pigeon pea)
Calmodulin
  and Ca^{2+} transport, spinach leaf, 1136
  -binding drugs, effect on response to plant hormones, *Amaranthus*, 219
  inhibitors, and cytokinin action, *Amaranthus*, 215
Capsicum annuum L. (*see* Pepper)
Carbohydrate
  accumulation, cucumber fruit, 498
  effect on respiratory rate, spinach/wheat/pea leaf, 598
Carbon
  inorganic, photosynthesis supply, *Asparagus* mesophyll, 886
  metabolism
    and water stress, *Xerosicyos*, 606, 611
    glyoxylate and glutamate effects, spinach chloroplast and mesophyll cell, 420
    soybean nodule, 634
Carbonic anhydrase, and magnesium, spinach chloroplast, 604
Carcica papaya L. (*see* Papaya)
β-Carotene, massive accumulation, *Dunaliella*, 593
Carrot
  ozone degradation, 1016
  sulfate transport, root cells, 204
    targeted liposome binding, protoplast, 386
Cassava, cyanide content and linamarase activity, root, 186
Castor bean
  crystalloid subunit structure, 376
  dicarboxylate transport, mitochondria, 434
  glycosyltransferase distribution, endosperm, 547
  ribulose-1,5-bisphosphate carboxylase, endosperm, 37
Catalpa, photosynthesis and leaf density thickness, 674
Catalpa speciosa (*see* Catalpa)
Cavitation events, *Thuja*, 1094
Cell
  arabinogalactan-protein biosynthesis, ryegrass endosperm, 754
  clone, water stress tolerance, tomato, 645
  fractionation, *Chlamydomonas*, 481
  heat stress response, pear, 817
  [^{14}C]leucine incorporation into protein, sycamore, 864
  line, salt tolerance, orange, 685
  membrane
    resistance, *Elodea*, 368
    icing stress, wheat, 535
  photoautotrophic growth, soybean, 426
  wall
    degradation, and polygalacturonase, tomato fruit, 1088
    -degrading enzyme changes, papaya fruit, 382
    hemicellulose, corn coleoptile, 515
    metabolism, pear fruit, 668

Cercis canadensis (see Redbud)
Chenopodium album L. (*see* Fat hen)
Chlamyodomonas reinhardii
chloroplast isolation and photosynthetic properties, 481, 488
chloroplast purification, 1130
glycolate formation and excretion, 1075
P_{700} Chl *a*-protein, 625
ribulose-1,5-bisphosphate carboxylase, small subunit synthesis, 847
Chlorella pyrenoidosa
glycolate formation and excretion, 1084
State 1—State 2 transitions, 1119
Chlorophyll fluorescence
and stress tolerance, crop plants, 1043
induction curve analysis, *Chlorella*, 1119
Chlorophyll-protein complex synthesis, *Euglena*, 616
Chloroplast
acyl-CoA synthetase and thioesterase location, pea, 735
cyclic photophosphorylation and $^{14}CO_2$ fixation, spinach, 313, 321
dicarboxylate-stimulated O_2 evolution, pea, 291
diphenylether effects, pea, 461
electron transport limits, barley, 795
glyoxylate effect on photosynthesis, spinach, 415
growth temperature and thylakoid lipids, pea, 225
isolation, *Chlamydomonas*, 481
lipid metabolism, 18:3 and 16:3 plants, 273
magnesium and carbonic anhydrase, spinach, 604
partial purification, *Chlamydomonas*, 1130
photosynthetic metabolism and glyoxylate, spinach, 420
photosynthetic properties, *Chlamydomonas*, 488
stromal acidification
and photosynthesis, spinach, 1100
and water stress inhibition, spinach, 1123
Chrysosplenium americanum, flavonol-ring B glucosyltransferase, 891
Circadian rhythm, and pH, *Neurospora*, 129
Citrate oxidation, potato mitochondria, 802
Citrus sinensis L. (*see* Orange)
CO_2
and light, sucrose synthesis, wheat, 767
assimilation pattern, tall fescue, 16
dissolved, measurement with IR gas analyzer, 212
fixation, legume root nodule, 469
$^{14}CO_2$ fixation, and cyclic photophosphorylation, spinach chloroplast, 313, 321
Coleoptile, cell wall hemicelluloses, corn, 515
Cordgrass, N availability and nitrogenase activity, 741
Corn
deseeding effect on IAA content, seedling, 526
fluorescence induction kinetics, leaf, 455
hemicelluloses of coleoptile cell wall, 515
light-enhanced protein synthesis, root cap, 833
mercury vapor uptake, 1040
N availability and nitrogenase activity, 741
NO_3^- inhibition of H^+-ATPase, root, 837
phloem unloading of sucrose, root, 362
polyamine gradients, seedling, 915
protoplast fusion by electric fields, 1110
Cotton, cyanide effect on membrane potential and ATP, 7
Cottonwood, photosynthesis and leaf density thickness, 674
Cotyledon
amino acid changes, pea, 492
hydroxypyruvate reductase purification, cucumber, 402
Cowpea
diurnal functioning, nodules, 308
IMP oxidoreductase and ureide formation, nodule, 1029
Crabgrass, mercury vapor uptake, 1040
Crassula argentea, CAM NAD malic enzyme, 1021
Crassulacean acid metabolism
and water stress, *Xerosicyos*, 606, 611
enzyme regulation in photosynthesis, *Kalanchoë*, 870, 877
Crassulacean acid metabolism plant (see *Kalanchoë daigremontiana*, Pineapple)
Crop plants, light and temperature stress tolerance, 1043
Crown gall tissue, cytokinin analysis, *Datura*, 858
Crystalloid protein, subunit structure, castor bean endosperm, 376
Cucumber
carbohydrate accumulation, fruit, 498
free space solutes, stem, 326
hydroxypyruvate reductase purification, cotyledon, 402
Cucurbita pepo L. (*see* Pumpkin)
Cyanide
and linamarase, cassava root, 186
effect on membrane potential and ATP, green tissue, 7
Cystine lyase, cabbage, 654
Cytokinin
action, and calmodulin inhibitors, *Amaranthus*, 215
crown gall tissue, *Datura*, 858
effect of calmodulin-binding drugs on response, *Amaranthus*, 219

D

Dactylis glomerata L. (*see* Orchard grass)
Dark, internode length and growth, pea, 759
Datura innoxia, cytokinin, crown gall tissue, 858
Daucus carota L. (*see* Carrot)
Decanoic acid, and ABA, Dutch iris, 713
Deep undercooling, woody taxa, 122
Dehydration injury, soybean seed, 620, 911
Density thickness, and photosynthesis, deciduous woody plants, 674
Dicarboxylate
stimulation of O_2 evolution, pea chloroplast, 291
transport, castor bean mitochondria, 434
2-(3,4-Dichlorophenoxy)triethylamine, effect on synthene, guayule, 897
Digitaria sanguinalis (see Crabgrass)
4,5-Dioxovalerate, and 5-aminolevulinic acid synthesis, maize leaf, 1056
Diphenylether, effects on chloroplast, pea, 461
Disease resistance, heat shock effect on mRNA response, pea, 553
Dithionite, and photosynthesis, *Oscillatoria*, 825
Diurnal variation, nodule functioning, cowpea, 308
DNA synthesis, and embryo growth, wheat, 394
rDNA, heterogeneity, pumpkin, 166
Dormancy release, and anaerobiosis, apple embryo, 1005
Dunaliella bardawil, massive β-carotene accumulation, 593
Dunaliella salina, galactolipid molecular species separation by HPLC, 903
Dutch iris, ABA and decanoic acid, 713

E

Echinochloa crus-galli (see Barnyard grass)
Electric field, protoplast fusion, 1110
Electron transport, rate-limiting steps, barley chloroplast, 795
Elodea densa, cell membrane input resistance, 368
Embryo
amino acid uptake, soybean, 781
anaerobiosis and dormancy release, apple, 1005
dynamics of inhibition, soybean, 190
RNA polymerase II subunit structure, wheat, 1068
RNA synthesis under anoxia, rice, 115
Endopeptidase activity, soybean, 345
Endosperm
arabinogalactan-protein biosynthesis, ryegrass, 754
crystalloid protein complex, castor bean, 376
glycosyltransferase distribution, castor bean, 547
mechanical resistance during low temperature germination, pepper, 146
mutant, barley, 679
ribulose-1,5-bisphosphate carboxylase, castor bean, 37
Enterolobium cyclocarpum, $^{15}N_2$ fixation and H_2 evolution, 909
Enzyme
and polyamine gradient, corn seedling, 915
protoplast isolation, *Trichoderma*, 641
regulation, CAM photosynthesis, *Kalanchoë*, 870, 877
Epicotyl, isolation of pisumin, pea, 391
Ethylene
effect on pedicel abscission, tobacco, 583
production
effect of glyphosate, tobacco callus, 855
lithium effect on thigmomorphogenesis, *Bryonia*, 522
role in growth response, rice, 441
Euglena gracilis, formation of photosynthetic apparatus, 616

F

Fat hen, lipid metabolism, chloroplast, 273
Ferredoxin/thioredoxin system, CAM photosynthesis, *Kalanchoë*, 870
Festuca arundinacea (see Tall fescue)
Flavonol-ring B glucosyltransferase, *Chrysosplenium*, 891
Flooding stress, and freezing, wheat, 303
Flower
anthocyanin methyltransferase localization, *Petunia*, 287
differentiation, tobacco thin cell layers, 33
morphometric study of ethylene-treated pedicels, tobacco, 583
Fluorescence, diurnal variations, CAM plant leaf, 455
Fragaria virginiana (see Strawberry)
Fraxinus pennsylvanica lanceolata (see Green ash)
Frond response, water stress, ostrich fern, 96

Fructose-1,6-bisphosphatase
and source-sink alterations, soybean, 474
and stress, spinach and pea leaf, 259
regulation of sucrose synthesis, wheat, 767
Fructose, 2,6-bisphosphate, and sucrose synthesis, spinach, 1139
Fruit
carbohydrate accumulation, cucumber, 498
cell wall-degrading enzyme changes, papaya, 382
cell wall metabolism, pear, 668
juice, oxygen and hydrogen isotopes, 725
polygalacturonase and ultrastructure of ripening, tomato, 1088

G

β-Galactofuranosidase, toxin conversion, *Helminthosporium*, 530
Galactolipid molecular species, separation by HPLC, *Dunaliella*, 903
Gas exchange
and phytoluminography, red kidney bean leaf, 90
and stomatal behavior, *flacca* tomato mutant, 245
Paphiopedilum, 906
Geranium, sulfur dioxide flux into leaf, 237
Geranium carolinianum L. (*see* Geranium)
Germination
mechanical resistance, pepper seed, 146
ribulose-1,5-bisphosphate carboxylase, castor bean seed, 37
Gibberellic acid, effect of calmodulin-binding drugs on response, *Amaranthus*, 219
Gibberellin A_{53} metabolism, effect of photoperiod, spinach, 86
Gliricidia sepium, $^{15}N_2$ fixation and H_2 evolution, 909
Globulin
isolation of mRNA, oat, 578
oat seed, 161
Glutamate
and 5-aminolevulinic acid synthesis, maize leaf, 1062
effect on carbon metabolism, spinach chloroplast and mesophyll cell, 420
Glutamine synthetase, isoform content in higher plants, leaf, 22
Glyceollin, inhibition of electron transport, soybean mitochondria, 151
Glycine decarboxylase, pea leaf mitochondria, 194
Glycine max (*see* Soybean)
Glycine sp., glycinin composition, 1114
Glycinin composition, *Glycine* sp., 1114
Glycinol, antibacterial action, soybean, 557
Glycolate formation and excretion
Chlamydomonas, 1075
Chlorella and *Netrium*, 1084
Glycosyltransferase, heterogeneous distribution, castor bean endosperm, 547
Glyoxylate
effect on carbon metabolism, spinach chloroplast and mesophyll cell, 420
effect on photosynthesis, spinach chloroplast, 415
Glyphosate, effect on ethylene production, tobacco callus, 855
Gossypium hirsutum (*see* Cotton)
Gravitropism, H^+ excretion and auxin, sunflower, 99
Green ash, photosynthesis and leaf density thickness, 674
Growth
and RNA/DNA synthesis, wheat embryo, 394
and water relations, *flacca* tomato mutant, 251
and water transport, pea internode, 332
characteristics, shrunken endosperm mutant, 679
effect of internode length genes, pea, 759
inhibitor, isolation of pisumin, pea epicotyl, 391
response, and ethylene, rice, 441
temperature effects on thylakoid lipids, pea chloroplast, 225
Guayule, regulation of cis-polyisoprene, 897
Gymnocladus dioicus (*see* Kentucky coffeetree)

H

H^+
excretion, and auxin, sunflower shoot gravitropism, 99
flux, motor tissue, *Samanea*, 564, 570
H^+-amino acid, derepression of cotransport, soybean embryo, 781
H^+-ATPase, NO_3^--sensitive, corn root, 837
Heat shock, effect on mRNA disease resistance, pea, 553
Heat-shock protein, tobacco protoplast, 26
Heat stress, cell response, pear, 817
Helianthus annuus L. (*see* Sunflower)
Helminthosporium sacchari, enzymic conversion of toxin, 530
Hemicellulose, coleoptile cell wall, corn, 515
Hexose kinase, subcellular localization, pea stem, 659
High performance liquid chromatography, separation of galactolipid molecular species, *Dunaliella*, 903
Hordeum vulgare L. (*see* Barley)
Host-pathogen interactions
soybean, 557
sycamore, 864
Host plant
effect on N isotopic fractionation, legumes, 1001
effects on *Rhizobium* physiology, pea, 156, 1011
Hydrogen
evolution
and $^{15}N_2$ fixation, tropical leguminous trees, 909
host effects, *Rhizobium*, 156, 1011
isotopes, fruit and vegetable juice, 725
Hydroxyl radical, ozone degradation, carrot, 1016
Hydroxypyruvate reductase, cucumber cotyledon, 402

I

Ice formation, effect of cold acclimination, rye protoplast, 978
Icing stress, cell membrane, wheat, 535
Imbibition, dynamics, soybean embryo, 190
Imbibitional leakage, soybean seed, 919
Immunoassay, NADP-glutamate dehydrogenase, *Sphaerostilbe*, 398
Impatiens balsamina, cyanide effect on membrane potential and ATP, 7
Indole-3-acetic acid
deseeding effect on shoot/root content, corn seedling, 526
metabolism and transport, bean, 691
Infrared gas analyzer system, measurement of dissolved CO_2, 212
Inga jinicuil, $^{15}N_2$ fixation and H_2 evolution, 909
Inosine monophosphate oxidoreductase, role in ureide formation, cowpea nodule, 1029
Intercellular space, air maintenance, maize and potato, 989
Internode
length, pea, 759
water transport and growth, pea, 332
Iris hollandica (*see* Dutch iris)
Isocitrate dehydrogenase, membrane-bound, potato mitochondria, 953, 959

K

Kalanchoë daigremontiana
cyanide effect on membrane potential and ATP, 7
enzyme regulation in CAM photosynthesis, 870, 877
fluorescence induction kinetics, leaf, 455
KCN, effects on root respiration, pea, 280
Kentucky coffeetree, photosynthesis and leaf density thickness, 674

L

Lactate dehydrogenase, and oxalic acid synthesis, lettuce leaf, 134
Lactuca sativa (*see* Lettuce)
Leaf
5-aminolevulinic acid synthesis routes, maize, 1056, 1062
aryl acylamidase activity, rice, 80
calmodulin and Ca^{2+} transport, spinach, 1136
CAM NAD malic enzyme, *Crassula*, 1021
cytosolic fructose-1,6-bisphosphatase and stress, spinach and pea, 259
fluorescence induction kinetics, CAM plants, 455
gas exchange and phytoluminography, bean, 90
glutamine synthetases of higher plants, 22
glycine decarboxylase, pea mitochondria, 194
lactate dehydrogenase and oxalic acid synthesis, lettuce, 134
localization of asparagine metabolism, pea, 1127
malate/aspartate shuttle, rye and wheat peroxisomes, 728
NaCl effect on proline synthesis, barley, 664
nitrogen and photosynthesis, wheat, 297
paraveinal mesophyll, soybean, 586
photosynthesis and density thickness, deciduous woody plants, 674
photosynthesis and respiration, spinach/wheat/pea, 598
senescence
and pod growth, soybean explants, 182
and respiration, oat, 540
role of osmotic gradient, strawberry, 931
sucrose export sources, sugar beet, 964
sucrose synthesis and fructose 2,6-bisphosphate, spinach, 1139
sulfur dioxide flux, geranium, 237
Lemna gibba L., phytochrome regulation, RNA sequences, 717
Lettuce, lactate dehydrogenase and oxalic acid synthesis, leaf, 134

Leucaena leucocephala, $^{15}N_2$ fixation and H_2 evolution, 909
[^{14}C]Leucine, incorporation into protein, sycamore cell, 864
Light
and CO_2, sucrose synthesis, wheat, 767
blue photoresponse modification by riboflavin analogs, *Neurospora*, 764
effect on cold acclimation, *Pinus* culture, 992
effect on flower differentiation, tobacco, 33
-enhanced protein synthesis, corn root cap, 833
-induced Pchlide reductase breakdown, oat and rye, 229
intensity adaptation, *Microcystis*, 829
quality effect on tiller production, *Lolium*, 900
-stimulated changes in acidity, oat protoplast, 351
stress tolerance, crop plants, 1043
Linamarase, and cyanide, cassava root, 186
Lipid metabolism, chloroplast, 18:3 and 16:3 plants, 273
Liposome, targeted binding, tobacco and carrot protoplast, 386
Lithium, effect on thigmomorphogenesis, in ethylene production, *Bryonia*, 522
Loblolly pine, anatomical computer analysis, Ethrel-treated seedling, 177
Lolium multiflorum (*see* Ryegrass)
Lolium spp., light quality and tiller production, 900
Lotus, N isotopic fractionation, 1001
Lotus corniculatus L. (*see* Birdsfoot trefoil)
Lotus pedunculatus L. (*see* Lotus)
Lucerne, N isotopic fractionation, 1001
Lycopersicon esculentum (*see* Tomato)
Lysine transport, barley mutants, 821

M

Macroptilium atropurpureum (*see* Siratro)
Magnesium, and carbonic anhydrase, spinach chloroplast, 604
Maize
5-aminolevulinic acid synthesis routes, leaf, 1056, 1062
intercellular air spaces, 989
O_2 transport and root respiration, seedling, 1035
starch branching enzyme immunology, 813
Malate/aspartate shuttle, leaf peroxisomes, rye and wheat, 728
Malus domestica (*see* Apple)
Manihot esculenta Crantz (*see* Cassava)
Mannitol, solution amendment for water potential calculation, 60
Mass spectrometry, cytokinin analysis, *Datura* crown gall tissue, 858
Matteucia struthiopteris L. (*see* Ostrich fern)
Mechanical resistance, low temperature germination, pepper seed, 146
Medicago sativa L. (*see* Alfalfa; Lucerne)
Membrane (*see also* Plasma membrane; Thylakoid membrane)
acyl-CoA synthetase and thioesterase location chloroplast envelope, pea, 735
-bound isocitrate dehydrogenase, potato mitochondria, 953, 959
icing stress, wheat cell, 535
input resistance, *Elodea* cell, 368
potential, effect of cyanide, green tissue, 7
vesicle, calmodulin and Ca^{2+} transport, spinach, 1136
Mercury vapor uptake, C_3 and C_4 plants, 1040
Mesophyll (*see also* Paraveinal mesophyll)
inorganic carbon supply for photosynthesis, *Asparagus*, 886
photosynthetic metabolism and glyoxylate, spinach, 420
Microcystis aeruginosa, light intensity adaptation, 829
Mitochondria
butyl gallate binding, mung bean, 339
citrate oxidation, potato, 802
dicarboxylate transport, castor bean, 434
glyceollin inhibition of electron transport, soybean, 151
glycine decarboxylase, pea leaf, 194
hexokinase, pea stem, 659
membrane-bound isocitrate dehydrogenase, potato, 953, 959
Morus alba (*see* Mulberry)
Motor tissue, H^+ flux, *Samanea*, 564, 570
Mulberry, photosynthesis and leaf density thickness, 674
Mung bean, butyl gallate binding, mitochondria, 339

N

^{15}N enrichment, soybean nodules, 256
N_2 fixation
and H_2 evolution, tropical leguminous trees, 909
hydrogenase-positive and -negative rhizobia, pigeon pea, 971
NaCl
effect on proline synthesis, barley leaf, 664
tolerance, cell line, orange, 685
NAD malic enzyme, *Crassula* leaf, 1021
NAD-specific isocitrate dehydrogenase, potato mitochondria, 953, 959
NADP-glutamate dehydrogenase, enzyme-linked immunoassay, *Sphaerostilbe*, 398
NADPH-protochlorophyllide oxidoreductase, light-induced breakdown, oat and rye, 229
Neoagardhiella bailyei, photosynthetic unit organization, 409
Netrium digitus, glycolate formation and excretion, 1084
Neurospora crassa
intracellular pH and circadian rhythm, 129
photoresponse modification by riboflavin analogs, 764
phototropism of perithecial beaks, 996
Nickel, requirement for apourease synthesis, soybean seed, 262
Nicotiana rustica (*see* Tobacco)
Nicotiana tabacum (*see* Tobacco)
Nightshade, lipid metabolism, chloroplast, 273
Nitrate reductase activity
and N nutrition, bean, 71
regulation, barley, 949
soybean mutants, 503, 510
Nitrogen
and photosynthesis, wheat flag leaf, 297
assimilation
bean, 71
nitrate reductase mutants, soybean, 510
availability, and nitrogenase activity, 741
isotopic fractionation, legumes, 1001
Nitrogenase
activity
and N availability, soybean, 741
and root respiration, soybean, 695, 701
host effects on acetylene reduction and hydrogen evolution, *Rhizobium*, 156
NO_3^-, inhibition of H^+-ATPase, corn root, 837
Nodule
carbon metabolism, soybean, 634
CO_2 fixation, legume root, 469
diurnal functioning, cowpea, 308
IMP oxidoreductase and ureide formation, cowpea, 1029
site of ^{15}N enrichment, soybean, 256

O

Oat
cyanide effect on membrane potential and ATP, 7
globulin mRNA, 578
light-stimulated acidity change, protoplast, 351
mercury vapor uptake, 1040
Pchlide reductase breakdown, 229
photochemistry of 124 kD phytochrome, 264
phytochrome-mediated cellular photomorphogenesis, seedling, 706
protoplast fusion by electric fields, 1110
respiratory-dependent acidification, protoplast, 356
seed globulin, 161
senescence and respiration, oat leaf, 540
Ontogeny, electron transport limits, barley chloroplast, 795
Opuntia ficus-indica, environmental responses, 775
Orange, salt tolerance, cell line, 685
Orchard grass, plasma membrane purification, 105
Organic acid constituents, and sugar, white clover, 1051
Oryza sativa L. (*see* Rice)
Oscillatoria limnetica, dithionite and photosynthesis, 825
Osmotic adjustment, and cold acclimation, strawberry, 938
Osmotic gradient, water stress and leaf senescence, strawberry, 931
Osmotic potential, stromal acidification and photosynthesis, spinach, 1100
Ostrich fern, differential frond response to water stress, 96
Oxalic acid synthesis, and lactate dehydrogenase, lettuce leaf, 134
Oxygen
evolution, dicarboxylate-stimulated, pea chloroplast, 291
isotopes, fruit and vegetable juice, 725
role in acidification, oat protoplast, 356
supra-ambient effect on nitrogenase activity and root respiration, soybean, 695
transport, and root respiration, maize seedling, 1035
Ozone degradation, carrot, 1016

P

P_{700} Chl *a*-protein, purification and characterization, barley, 625
Papaya, ripening fruit wall-degrading enzyme changes, 382
Paphiopedilum insigne, gas exchange, 906
Paraveinal mesophyll, soybean leaf, 586
Parthenium argentatum (*see* Guayule)
Pea
acyl-CoA synthetase and thioesterase location, chloroplast envelope, 735
amino acids, developing cotyledon, 492
cytosolic fructose-1,6-bisphosphatase and

Pea—*continued*
stress, leaf, 259
dicarboxylate-stimulated O_2 evolution, chloroplast, 291
diphenylether effects, chloroplast, 461
free space solutes, stem, 326
glycine decarboxylase, leaf mitochondria, 194
growth temperature and thylakoid lipids, chloroplast, 225
heat shock and mRNA disease resistance, 553
host effects on *Rhizobium* physiology, 156, 1011
internode length, 759
KCN and salicylhydroxamic acid effects, root respiration, 280
lipid metabolism, chloroplast, 273
localization of asparagine metabolism, leaf, 1127
mitochondrial hexokinase, 659
osmotic properties and growth, internodes, 332
photosynthesis and respiration, leaf, 598
pisumin from epicotyls, 391
SO_2 effect, stomatal metabolism, 573
ureide enzymes, 56
Pear
cell wall metabolism, fruit, 668
heat stress cell response, 817
Pearl millet, N availability and nitrogenase activity, 741
Pedicel, ethylene effect on abscission, tobacco, 583
Pennisetum americanum L. (*see* Pearl millet)
Pepper, mechanical resistance, seed, 146
Perithecial beak, phototropism, *Neurospora*, 996
Peroxisome, malate/aspartate shuttle, rye and wheat leaf, 728
Petunia
anthocyanin methyltransferase localization, flower, 287
P_{700} Chl *a*-protein, 625
Petunia axillaris, protoplast fusion by electric fields, 1110
Petunia hybrida (*see* Petunia)
Phaseolus vulgaris L. (*see* Bean)
pH (*see also* Acidification)
and circadian rhythm, *Neurospora*, 129
light-stimulated change, oat protoplast, 351
Phloem unloading
soybean seed, 268
sucrose, corn root, 362
Photoautotrophism, soybean culture growth, 426
Photochemistry, 124 kD phytochrome, oat, 264
Photomorphogenesis, oat seedling, 706
Photoperiod, effect on gibberellin A_{53} metabolism, spinach, 86
photophosphorylation, and $^{14}CO_2$ fixation, spinach chloroplast, 313, 321
Photoresponse, modification by riboflavin analogs, *Neurospora*, 764
Photosynthesis
CAM enzyme regulation, *Kalanchöe*, 870, 877
carbon assimilation pattern, tall fescue, 16
contribution of HCO_3^- ions, *Asparagus*, 886
dithionite, *Oscillatoria*, 825
glyoxylate effect, spinach chloroplast, 415
leaf density thickness, deciduous woody plants, 674
nitrogen, wheat flag leaf, 297
regulation of sucrose synthesis, wheat, 767
respiration, spinach/wheat/pea, 598
and stomatal conductance, potato clones, 172
stromal acidification, spinach, 1100, 1123
temperature and ribulose 1,5-bisphosphate, wheat, 945
triazine-resistant *Amaranthus*, 925
Photosynthetic apparatus formation, *Euglena*, 616
Photosynthetic unit organization, *Neoagardhiella*, 409
Phototropism, perithecial beaks, *Neurospora*, 996
Phytoalexin synthesis, inhibition, arachidonic acid-stressed potato tissue, 746
Phytochrome
-mediated photomorphogenesis, oat seedling, 706
photochemistry, oat, 264
regulation of RNA sequences, *Lemna*, 717
Phytoluminescence, red kidney bean leaf, 90
Pigeon pea, hydrogenase-positive and -negative rhizobia, 971
Pineapple, fluorescence induction kinetics, leaf, 455
Pinus sylvestris L., cold acclimation of suspension cultures, 992
Pinus taeda L. (*see* Loblolly pine)
Pisum sativum L. (*see* Pea)
Pisumin, isolation as growth inhibitor, pea epicotyl, 391
Plasma membrane
ATPase, aspartyl phosphate, red beet, 1133
purification, orchard grass, 105
Pod development, and leaf senescence, soybean explants, 182
Polyamine gradient, corn seedling, 915
Polyethylene glycol
-induced water stress tolerance, tomato cell clones, 645
water potential, 66
Polyethylene glycol/dextran, water potential calculation by mannitol amendment, 60
Polygalacturonase, ripening ultrastructure and cell wall degradation, tomato fruit, 1088
Populus deltoides (*see* Cottonwood)
Potato
citrate oxidation, mitochondria, 802
inhibition of phytoalexin synthesis, arachidonic acid-stressed tissue, 746
intercellular air spaces, 989
membrane-bound isocitrate dehydrogenase, mitochondria, 953, 959
photosynthesis and stomatal conductance, clones, 172
Proline
distribution, and water stress, tobacco protoplast, 590
synthesis, salt-treated leaf, barley, 664
Prolyl hydroxylase, subcellular distribution, ryegrass, 754
Protein (*see also* Crystalloid protein)
changes, seed stratification, apple, 750
heat shock, tobacco protoplast, 26
synthesis, light-enhanced, corn root cap, 833
Protoplast
cold acclimation and ice information, rye, 978
enzymes for isolation, *Trichoderma*, 641
fusion by electric fields, 1110
heat-shock proteins, tobacco, 26
light-stimulated acidity change, oat, 351
respiratory-dependent acidification, oat, 356
targeted liposome binding, tobacco and carrot, 386
water stress and proline distribution, tobacco, 590
Prunus americana (*see* American plum)
Pumpkin, heterogeneity of rDNA, 166

Q

Quercus rubra (*see* Red oak)

R

Rate-limiting step
chloroplast electron transport, barley, 795
inorganic carbon supply for photosynthesis, *Asparagus*, 886
Red beet, aspartyl phosphate, plasma membrane ATPase, 1133
Red oak, photosynthesis and leaf density thickness, 674
Redbud, photosynthesis and leaf density thickness, 674
Respiration
photosynthesis, spinach/wheat/pea, 598
role in acidification, oat protoplast, 356
senescence, oat leaf, 540
Rhizoium
effect on N isotopic fractionation, legumes, 1001
host effects on physiology, 156, 1011
hydrogenase-positive and -negative, pigeon pea, 971
Riboflavin analogs, photoresponse modification, *Neurospora*, 764
Ribulose 1,5-bisphophate, and temperature, wheat, 945
Ribulose-1,5-bisphosphate carboxylase
castor bean endosperm, 37
reaction kinetics variability, barley, 76
small subunit accumulation, *Chlamydomonas*, 847
Rice
aeration under water, 447
aryl acylamidase activity, leaf, 80
ethylene and submergence, 441
N availability and nitrogenase activity, 741
RNA synthesis under anoxia, 115
Ricinus communis L. (*see* Castor bean)
Ripening, polygalacturonase and ultrastructure, tomato fruit, 1088
RNA
sequences, phytochrome regulation, *Lemna*, 717
synthesis
and embryo growth, wheat, 394
under anoxia, rice, 115
mRNA
heat shock and disease resistance response, pea, 553
oat globulin, 578
RNA polymerase II, subunit structure, wheat embryo, 1068
Root
altered amino acid uptake, barley mutants, 821
cyanide and linamarase, cassava, 186
KCN and salicylhydroxamic acid effects on respiration, pea, 280
light-enhanced protein synthesis, corn, 833
NO_3^- inhibition of H^+-ATPase, corn, 837
nodule CO_2 fixation, legumes, 469
phloem unloading of sucrose, corn, 362
respiration

nitrogenase activity, soybean, 695, 701
oxygen transport, maize seedling, 1035
sulfate transport, carrot, 204
Rye
cold acclimation and ice formation, protoplast, 978
malate/aspartate shuttle, leaf peroxisome, 728
Pchlide reductase breakdown, 229
Ryegrass, arabinogalatan-protein biosynthesis, endosperm, 754

S

Salicylhydroxamic acid, effects on root respiration, pea, 280
Samanea saman, H^+ flux, motor tissue, 564, 570
Secale cereale L. (*see* Rye)
Seed
anaerobiosis, barnyard grass, 44, 787
dehydration injury, soybean, 620, 911
globulin, oat, 161
imbibitional leakage, soybean, 919
KCN and salicylhydroxamic acid effects, root respiration, pea, 280
mechanical resistance during low temperature germination, pepper, 146
nickel-free urease, soybean, 262
phloem unloading, soybean, 268
ribulose-1,5-bisphosphate carboxylase, castor bean endopserm, 37
stratification, protein changes, apple, 750
Seedling
anatomical computer analysis, loblolly pine, 177
deseeding effect on IAA content, corn, 526
endosperm ribulose-1,5-bisphosphate carboxylase, castor bean, 37
Ethrel-treated, tissue analysis, loblolly pine, 177
O_2 transport and root respiration, maize, 1035
photomorphogenesis, oat, 706
polyamine gradients, corn, 915
Senescence (*see also* Leaf senescence)
and respiration, oat leaf, 540
electron transport limits, barley chloroplast, 795
role of osmotic gradient, strawberry leaf, 931
Silver maple, photosynthesis and leaf density thickness, 674
Siratro, N isotopic fractionation, 1001
Small subunit accumulation, ribulose-1,5-bisphosphate carboxylase, *Chlamydomonas*, 847
SO_2
effect on stomatal metabolism, pea, 573
flux into geranium leaf, 237
Solanum nodiflorum L. (*see* Nightshade)
Solanum tuberosum L. (*see* Potato)
Solute
efflux, dehydration-injured seed, soybean, 911
stem tissue free space, pea/soybean/cucumber, 326
Sorghum
mercury vapor uptake, 1040
N availability and nitrogenase activity, 741
Sorghum bicolor L. (*see* Sorghum)
Source-sink alterations, and sucrose phosphate synthase, soybean, 474
Source-sink tissue, ABA uptake, sugar beet, 430
Soybean
amino acid uptake, developing embryo, 781
carbon metabolism, nodules, 634
CO_2 fixation, root nodule, 469
dehydration injury, seed, 620, 911
dynamics of imbibition, embryo, 190
endopeptidase activity, 345
free space solutes, stem, 326
glyceollin inhibition of electron transport, mitochondria, 151
glycinin composition, perennial relations, 1114
host-pathogen interactions, 557
imbibitional leakage, seed, 919
leaf senescence and pod growth, explants, 182
N availability and nitrogenase activity, 741
N isotopic fractionation, 1001
nickel-free urease, seed, 262
nitrate reductase mutants, 503, 510
P_{700} Chl *a*-protein, 625
paraveinal mesophyll, leaf, 586
phloem unloading, seed, 268
photoautotrophic cultures, 426
root respiration associated with nitrogenase activity, 701
site of ^{15}N enrichment, nodules, 256
source-sink alterations and sucrose phosphate synthase, 474
supra-ambient O_2 effect on nitrogenase activity, 695
ureide enzymes, 56
Spartina alterniflora (*see* Cordgrass)
Sphaerostilbe repens, NADP-glutamate dehydrogenase immunoassay, 398
Spinach
calmodulin and Ca^{2+} transport, leaf, 1136
cyclic photophosphorylation and $^{14}CO_2$ fixation, chloroplast, 313, 321
cytosolic fructose-1,6-bisphophatase and stress, leaf, 259
glyoxylate effect on photosynthesis, chloroplast, 415
magnesium and carbonic anhydrase, chloroplast, 604
photoperiod and gibberellin A_{53} metabolism, 86
photosynthesis and respiration, leaf, 598
photosynthetic metabolism and glyoxylate, chloroplast and mesophyll cell, 420
regulation of acetyl-CoA carboxylase, 50
stromal acidification
and photosynthesis, chloroplast, 1100
and water stress inhibition, chloroplast, 1123
sucrose synthesis and fructose, 2.6-bisphosphate, leaf, 1139
Spinacia oleracea L. (*see* Spinach)
Starch branching enzyme, immunology, maize, 813
Starch formation, and source-sink alterations, soybean, 474
State 1—State 2 transitions, *Chlorella*, 1119
Stem, free space solutes, pea/soybean/cucumber, 326
Stomata, SO_2 effect on metabolism, pea, 573
Stomatal conductance
gas exchange, *flacca* tomato mutant, 245
photosynthesis, potato clones, 172
Strawberry
osmotic adjustment and cold acclimation, 938
whole plant osmotic gradients, 931
Stromal acidification
osmotically induced, and photosynthesis, spinach, 1100
water stress inhibition and photosynthesis, spinach, 1123
Subclover, host effects on *Rhizobium* nitrogenase, 156
Subunit structure, RNA polymerase II, wheat embryo, 1068
Sucrose
export sources, sugar beet leaf, 964
phloem unloading, corn root, 362
synthesis
and fructose 2,6-bisphosphate, spinach, 1139
varying light and CO_2, wheat, 767
uptake and compartmentation, sugar beet taproot, 1
Sucrose phosphate synthase
regulation of sucrose synthesis, wheat, 767
source-sink alterations, soybean, 474
Sugar
and organic acid constituents, white clover, 1051
effect on flower differentiation, tobacco, 33
Sugar beet
ABA uptake, source-sink tissue, 430
sucrose export sources, leaf, 964
Sugar beet
sucrose uptake and compartmentation, taproot, 1
Sugar maple, photosynthesis and leaf density thickness, 674
Sulfate transport, carrot root cells, 204
Sulfide utilization, and dithionite, *Oscillatoria*, 825
Sunflower
fluorescence induction kinetics, leaf, 455
H^+ excretion, auxin, and gravitropism, 99
Suspension culture
cold acclimation, *Pinus*, 992
photoautotrophic growth, soybean, 426
Swiss chard, regulation of acetyl-CoA carboxylase, 50
Sycamore, host-pathogen interactions, 864
Synthene, effect of 2-(3,4-dichlorophenoxy)triethylamine, guayule, 897

T

Tall fescue, CO_2 assimilation pattern 16
Taproot, sucrose uptake and compartmentation, sugar beet, 1
Temperature
and ribulose 1,5-bisphosphate, wheat, 945
cold, deep undercooling in woody taxa, 122
cold acclimation
and osmotic adjustment, strawberry, 938
effect on ice formation, rye protoplast, 978
suspension culture, *Pinus*, 992
effects during growth on thylakoid lipids, pea chloroplast, 225
heat shock and mRNA disease resistance, pea, 553
heat-shock proteins, tobacco protoplast, 26
heat stress, pear, 817
low
mechanical resistance, pepper seed, 146
stress, and flooding, wheat, 303
stress, and fructose-1,6-bisphosphatase, spinach and pea leaf, 259
stress tolerance, crop plants, 1043

Thigmomorphogenesis, lithium effect in ethylene production, *Bryonia*, 522
Thioredoxin-linked enzymes, CAM photosynthesis, *Kalanchoë*, 877
Thuja occidentalis L., ultrasonic acoustic emissions, sapwood, 1094
Thylakoid membrane, lipid and protein content, growth temperature effects, pea, 225
Tiller production, light quality effect, *Lolium*, 900
Tobacco
  cyanide effect on membrane potential and ATP, 7
  glyphosate effect on ethylene production, callus, 855
  heat-shock proteins, mesophyll protoplast, 26
  morphometric study of ethylene-treated pedicels, 583
  P_{700} Chl *a*-protein, 625
  targeted liposome binding, protoplast, 386
  thin cell layer flower differentiation, 33
  water stress and proline distribution, protoplast, 590
Tomato
  1-aminocyclopropane-1-carboxylate synthase regulation, 139
  gas exchange, stomatal behavior, and ABA, *flacca* mutant, 245
  P_{700} Chl *a*-protein, 625
  polygalacturonase and ultrastructure of ripening, 1088
  water relations, growth, and ABA, *flacca* mutant, 251
  water stress tolerance, cell clones, 645
Toxin, conversion to toxoid by β-galactofuranosidase, *Helminthosporium*, 530
Triazine-resistant *Amaranthus*, photosynthesis, 925
Trichoderma viride, enzymes for protoplast isolation, 641
Trifolium repens L. (*see* White clover)
Trifolium subterraneum L. (*see* Subclover)
Triticum aestivum L. (*see* Wheat)

U

Ultrasonic acoustic emission, *Thuja* sapwood, 1094
Urease, nickel-free, soybean seed, 262
Ureide
  enzymes, pea and soybean, 56
  formation, and IMP oxidoreductase, cowpea nodule, 1029

V

Vegetable juice, oxygen and hydrogen isotopes, 725
Vigna aconitifolia, protoplast fusion by electric fields, 1110
Vigna angularis (*see* Adzuki bean)
Vigna unguiculata L. (*see* Cowpea)

W

Water
  potential
    aqueous two-phase solutions, 60
    PEG solution, 66
  relations
    and diurnal acidity, *Opuntia*, 775
    and growth, *flacca* tomato mutant, 251
  stress
    and carbon metabolism, *Xerosicyos*, 606, 611
    and proline distribution, tobacco protoplast, 590
    differential frond response, ostrich fern, 96
    inhibition, and stromal acidification, spinach, 1123
    osmotic gradient, strawberry, 931
    tolerance in cell clones, tomato, 645
  transport, and growth, pea internodes, 332
Wheat
  icing stress and cell membrane, 535
  low temperature stress and flooding, 303
  malate/aspartate shuttle, leaf peroxisome, 728
  mercury vapor uptake, 1040
  nitrogen and photosynthesis, flag leaf, 297
  photosynthesis and respiration, leaf, 598
  regulation of acetyl-CoA carboxylase, 50
  RNA polymerase II subunit structure, embryo, 1068
  RNA/DNA synthesis and embryo growth, 394
  sucrose synthesis, varying light and CO_2, 767
  temperature and ribulose 1,5-bisphosphate, 945
White clover
  N isotopic fractionation, 1001
  sugar and organic acid constituents, 1051
Wild rice, N availability and nitrogenase activity, 741
Woody taxa, deep undercooling, 122

X

Xerosicyos danguyi, water stress and carbon metabolism, 606, 611
Xylanase purification, fruit cell wall, pear, 668

Z

Zea mays L. (*see* Corn, Maize)
Zizania aquatica L. (*see* Wild rice)